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Device for taking the weight of a one-leaf or two-leaf  
door for a switchgear cabinet

Description

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The invention relates to a device according to the precharacterizing clause of claim 1.

10 An electronic switchgear cabinet in which components, in particular for a low voltage, are installed, has an electrical frame, which is made up of profiled bars which are mechanically connected to one another at their corners by means of a corner connector. In addition, a switchgear cabinet of this type has a door,  
15 which may be formed as a one-leaf door or two-leaf door. The one-leaf door is hinged with a vertical side edge on a vertical profiled bar at the front; with the other side edge, the door strikes against the other vertical profiled bar and can be locked there by means  
20 of a closure. In the case of some switchgear cabinets, such a closure is formed by two vertically running rods, which are moved upward and downward by means of a manually operable rotary handle; the upper closure rod moves upward and the lower one moves downward to  
25 achieve closure of the door. There is also the possibility of using the rotary handle to operate a pivoting blade which can engage behind a stop on the vertical profiled bar.

30 In the case of a two-leaf door, both leaves are suspended in a hinged manner on a respective profiled bar with their one, respectively opposite, vertically running side edges; in the closed state, the door leaves overlap and the closure takes place, as in the  
35 case of a one-leaf door, by manually driven closing rods being extended upward and downward behind stops.

The weight of the door or the door leaves in the case of the currently known low-voltage switchgear cabinets is taken essentially by the hinged suspension of the door or the door leaves on the profiled bar or bars.

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The object of the invention is to provide a device of the type stated at the beginning with which the loading of the door hinges is reduced.

10 This object is achieved according to the invention by the features of claim 1.

According to the invention, at least one guiding element is provided, with at least one run-up sloping  
15 surface or run-up slope, which in the case of a one-leaf door is arranged in the region on the free side edge and interacts with a run-up edge on the profiled bar against which the door strikes in such a way that, during closing, the guiding element slides with its  
20 run-up slope onto the run-up edge and thereby takes part of the weight of the door.

In the case of a two-leaf door, the at least one guiding element is located in the region of the upper  
25 side edge of each door leaf and in the vicinity of the vertical free side edges and, during closing, slides with its run-up slope onto a respective run-up edge at least on the upper horizontal profiled bar, so that the guiding element takes the weight of the door leaves.  
30 In an expedient way, a guiding element is respectively provided on the two door leaves in the region of the free side edges.

With the use of the guiding element or the guiding  
35 elements, the door hinges are no longer subjected to the load of the entire weight of the door or the door leaves; part of the weight is then also taken by the guiding elements.

According to a further refinement of the invention, if the closing rods are formed from flat material, the guiding element may be formed with a lug, which lug  
5 engages over an edge of the closing rod to guide the latter.

In an expedient way, the closing rod is arranged such that it is aligned with its rod side surfaces  
10 perpendicular to the fastening plane for the guiding element; the sliding surface consequently runs in an expedient way perpendicular to the fastening plane; the lug is formed in an L-shaped manner, the free leg of the L shape running parallel to the sliding surface  
15 toward the fastening plane, so that, when the closing rod is installed with its wide side surfaces perpendicular to the surface of the door, the lug engages over the free longitudinal edge and the closing rod slides along with its wide side on the sliding  
20 surface.

According to a particularly advantageous refinement of the invention, the guiding element is formed in a trapezoidal manner, all the delimiting surfaces other  
25 than the fastening surface and the sliding surface, which run perpendicular to each other, narrowing toward the free end - as seen from the fastening surface.

Further advantageous refinements and improvements of  
30 the invention can be taken from the further subclaims.

The invention and further advantageous refinements and improvements and further advantages are to be explained and described in more detail on the basis of the  
35 drawing, in which two exemplary embodiments are represented and in which:

Figures 1 to 3 show three different perspective views of a guiding element

Figure 4 shows a door leaf with a guiding element according to the invention as shown in Figures 1 to 3 and a run-up edge and

Figure 5 shows a perspective view of the upper part-region of a two-leaf door.

Reference is firstly to be made to Figure 4.

A switchgear cabinet for a low-voltage switchgear assembly comprises as a base structure a frame which is made up of a number of profiled bars, which are arranged perpendicularly on one another and are connected to one another by means of corner connectors.

Figure 4 then shows the vertically running profiled bar 10 of the frame (not represented any further), against which the side edge 11 of a one-leaf door 12 comes to lie.

Fastened on the outer surface of the profiled bar 10, which has a triangular cross-sectional shape with a hypotenuse 14, which is directed outwards as seen from the interior of the switchgear cabinet, is a holding block 13, which has for instance an elongated rectangular base plate 15, formed on which are arms 16 and 17, of which the upper arm 16 has, in the same way as the lower arm 17, a leg 18 running parallel to the front wall or the surface of the door, the upper end edge 19 of which leg, as seen in the drawing of Figure 4, forms a run-up edge for a guiding element 20 fastened in the interior of the door 12.

The guiding element 20 is described in more detail in Figures 1 to 3. It has a fastening side 21, which is also referred to as the fastening surface and with

which the fastening element 20 is placed onto the inner surface of the door 12 and fastened to it. Extending from this fastening surface 21 are run-up surfaces 22, 23 and 24, the two run-up surfaces 22 and 23 approaching each other toward the free end - as seen from the fastening surface 21 - so that the two together form a V shape which is open toward the fastening surface 21. The run-up surfaces 24 run at an angle of  $< 90^\circ$  to the fastening surface, so that these surfaces 24 are also run-up surfaces. Figure 1 shows two run-up surfaces 24, which have the reference numerals 24a and 24b; both run-up surfaces 24a and 24b lie in one plane and the intermediate space between the guiding element portions 20a and 20b merely has the task of reducing the weight of the guiding element 20.

Formed perpendicular to the fastening surface 21 is a sliding surface 25, on the edge 26 of which, lying opposite from the fastening surface 21, there is formed a hook-shaped or L-shaped lug 27, which has a first leg 28, running perpendicular to the sliding surface 25 or parallel to the fastening surface 21, and a second leg 29, projecting parallel to the sliding surface 25 toward the fastening surface 21.

Reference is now to be made to Figure 4. Fastened to the inner side of the door leaf 11, by means of a screw connection 30, is the guiding element 20 represented in Figures 1 to 3, the fastening surface 21 coming to lie on the inner surface of the door leaf. For insertion through the screw connection 30, a through-hole 31 is provided in the guiding element 20. The fact that recesses 32 and the like can also be provided at the same time is of no significance for the invention. Recesses 33 and 34 that extend from the fastening surface 21 and continue into the free ends of the parts 20a, 20b serve merely for saving weight.

Arranged on the inner side of the door is a fastening lock 35, which is not represented any more specifically and can be operated by means of a handle 36 arranged on the outer side of the door leaf. This lock 35 serves  
5 the purpose of displacing closing rods 37 and 38, the closing rod 37 being moved upward in the direction of the arrow  $V_1$  and the closing rod 38 being moved downward in the direction of the arrow  $V_2$  for closing and in the opposite directions for unlocking the  
10 closure. The closing rods 37 have an elongated rectangular cross section, the wide side surfaces 39 of the closing rods 37, 38 running perpendicular to the door leaf. One of the side surfaces 39 slides on the sliding surface 25 of the guiding element and the  
15 closing rods are guided by the guiding element, since their narrow longitudinal edge, lying opposite from the door leaf, is enclosed by the leg 29.

If the door is now to be closed, the vertical free side  
20 edge of the door 11 moves in the direction of the arrow S against the profiled bar 10, the run-up surface or side surface 22 sliding against the run-up edge 19 on the leg 18; as a result, the door is raised and part of the weight is carried by the run-up edge 19 and the  
25 run-up surface 22 on the guiding part 20.

Reference is now to be made to Figure 5. A part-region of a switchgear cabinet frame is represented, seen from above, toward the inner surface of the door in the  
30 interior of the switchgear cabinet. The switchgear cabinet frame has a horizontally running profiled bar 50, which corresponds to the profiled bar 10. The switchgear cabinet has a so-called two-leaf door with a first door leaf 51 and a second door leaf 52, which in  
35 the closed state lie with their free side edges next to one another. Formed on the door leaf 52 is a tab 53, which lies behind the door leaf 51, so that the door leaf 52 is kept closed by means of the door leaf 51 via

the tab 53. Fastened to the inner surface both of the door leaf 51 and of the door leaf 52 is a respective guiding element 54 and 55, which corresponds identically to the guiding element as shown in Figures 1 to 3. The sliding surface 25 runs perpendicular to the respective inner surfaces of the door leaves 51 and 52 and is respectively located on the side directed toward the upper end of the door leaves. As a result, the run-up surfaces 24, 24a, 24b, not visible here, lie underneath and can run onto a run-up edge or onto two run-up edges provided on the upper horizontally running profiled bar; in this case there is the possibility that the run-up edge is formed by the profiled bar 50 itself or by a run-up leg fastened to the profiled bar 50.